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Comments:

From the SCS Chief

Less Salt, Better Crops

In the arid West, the Soil Conservation Service is working to control excessive salinity on irrigated cropland to conserve water, protect water quality, and preserve the land's long-term productivity.

About 61 million acres of irrigated cropland produce close to a third of the total market value of U.S. farm products. These irrigated acres supply a tremendous variety of fruits and vegetables. California alone produces more than 200 different food crops.

These productive lands also face severe salinity problems. Major rivers like the Colorado, Arkansas, and Pecos, on which farmers depend heavily for irrigation water, are becoming increasingly saline. Montana, South Dakota, Oklahoma, and other High Plains States are having problems with saline seeps. In many coastal States, salt water is intruding into fresh water aquifers that are being overdrawn for irrigation and municipal or industrial use. California has problems with increasing soil salinity and the disposal of highly saline drainage water.

To help farmers deal with this wide range of salinity problems and at the same time conserve and protect water supplies, SCS and other Federal, State, and local agencies and conservation districts are cooperating on a variety of projects.

In the Colorado River Basin Salinity Control Program, for example, SCS is cooperating with USDA's Agricultural Research Service, the Cooperative Research Service, the Extension Service, and the Agricultural Stabilization and Conservation Service with good results.

In the Uinta Basin, Utah, and Grand Valley, Colo., annual salt loads to the Colorado River already have been reduced by an estimated 29,000 tons. In the 65,000-acre Wellton Mohawk Irrigation and Drainage District in Arizona, salinity control and water management have been improved on 26,400 acres.

Good cooperation and results also characterize our mutual efforts to solve saline seeps in Montana and to control salinity in targeted areas of California, Colorado, Utah, and Nevada.

SCS is working to improve its technical support and guidance for field people—two water quality training modules now being prepared will deal with salinity problems and solutions, for example.

Salinity is a long-term resource management problem; we all need to stay on top of the latest technology in salinity control and help farmers use it to improve their land and water.

Cover: The Soil Conservation Service and other USDA agencies are cooperating to combat salinity problems which can rob irrigated cropland of its long-term productivity. (See Chief's Comments and Less Salt, Better Crops on pages 3 through 6.)

John R. Block
Secretary of Agriculture

Peter C. Myers, Chief
Soil Conservation Service

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Taking the Guesswork Out of Managing Saline Soils

At the U.S. Salinity Laboratory in Riverside, Calif., a U.S. Department of Agriculture Agricultural Research Service Soil Scientist, James Rhoades, has been developing instruments and techniques for measuring soil salinity. Rhoades' accomplishments include an electronic salinity probe which is inserted into the soil, a hand-held electromagnetic device which measures salinity from above ground, and another electromagnetic salinity monitoring device, not yet commercially available, which can be placed below ground in a plastic access tube installed in the soil.

Soil Conservation Service field personnel are already using some of the devices to help western farmers fine-tune their irrigation management and avoid problems caused by excessive soil salinity. Farmers in the arid West must contend with excessive salinity because many soils in the area are already high in salt, and the irrigation water adds more.

Snowmelt, the source of much irrigation water in the West, contains almost no salt. As it passes through soils and aquifers, the water picks up dissolved salts. The salty water resurfacing in springs and streams at lower elevations is used for irrigation.

Lower Colorado River water with salinity concentrations of 735 parts per million contains approximately 1 ton of salt per acre foot. A farmer applying 3 acre feet of water on a field is also adding 3 tons of salt. The evaporation of saline water carried to the soil surface by capillary action from shallow water tables also causes salts to accumulate on or near the soil surface.

High soil salinity levels on irrigated land pose a major problem to farmers. This alfalfa crop in California's Imperial Valley has been severely reduced because of salt buildup.

Photo by Tim McCabe, visual information specialist, Public Information, SCS, Washington, D.C.

Accumulated salts in the soil profile limit crop production. Excess salt hinders plant growth and reduces crop yields by limiting plants' ability to extract water from the soil. Salts dissolved in the soil water set up an additional force, an osmotic potential, which must be overcome within the root cells. To do this the plant builds up dissolved organic solutes to a higher level within its cells causing water to diffuse through a semi-permeable membrane and into the plant cells. The extra energy it takes to generate these organic solutes and to pull fresh water from saline soil water reduces yields for many crops.

As water is removed from the soil by plants, the salt concentration in the remaining soil water increases, strengthening the osmotic effect. Keeping the soil water content near field capacity minimizes this effect.

With shortages of water, especially in the West, farmers are striving to be efficient and conserve water. But, in many areas, when a farmer applies irrigation water to just meet the plants' needs, salts build up excessively in the soil. To prevent the soil from becoming too salty for growing crops, some extra water must be applied to leach salts beyond the root zone.

"Farmers needed to know what the current salinity level was and what the plants could tolerate so that they could irrigate accordingly," said Rhoades. "The people who help farmers improve their irrigation management needed a way to go out to the field and measure salinity onsite." These needs inspired Rhoades to develop the electronic salinity probe.

"The more soluble salts a soil contains, the better the soil conducts electricity," said Rhoades. "My objective has been to develop some devices and techniques that enable us to more easily measure soil salinity by measuring how well a soil conducts electricity."

Rhoades first developed the electronic salinity probe, which became commercially available about 4 years ago. It is a

modification of a technique which used four separate electrodes inserted into the soil up to hundreds of feet apart. This technique has been used by geophysicists to locate ore bodies and oil deposits. The main drawbacks to using it for measuring soil salinity, according to Rhoades, were that it could not give a reading of the distribution of salinity throughout a soil profile or for a specific volume of soil.

The probe which Rhoades designed is a self-contained unit with its own power source and conductivity meter. It can measure salinity within 6-inch increments down to 4 feet, about as far as most crop roots grow. There are four cylindrical electrodes uniformly spaced around the approximately 1-inch-diameter shaft of the probe. It is inserted into the soil and an electrical current is applied to the two outer electrodes. By measuring the inner electrodes' resistance to the current, the probe provides the information needed to determine the electrical conductivity of the soil, its water, and salts. The conductivity reading reflects the amount of salt in the soil water.

"Under the furrows in an irrigated field, the salt is usually leached out, but in the plant bed, water flows up into the bed and the salt goes with it and accumulates," said Rhoades. "A micro-version of this new salinity probe is also available and can be used to read salinity in the top inch or so of the seedbed to determine if irrigation is needed before planting."

Another version is also available which can be used for long-term monitoring of leaching efforts. Several probes can be installed at strategic locations and read regularly until excessive salts have been leached below the root zone.

Rhoades said, "The old way to measure the amount of salt dissolved in the water in a soil required taking a soil sample back to the lab, drying it, grinding it, mixing it with water, and putting it in a vacuum apparatus to separate the water from the soil. Scientists then measured the salt which had dissolved out of the soil and into the water." This method required many soil samples to be taken to give a picture of salinity conditions in a farmer's field. The method was expensive, time-consuming, and often inaccurate.

"Although salinity is a transient condition and changes with time and leaching," said Rhoades, "there is a need for salinity surveys and maps to show if saline soils are getting better or worse."

To make these kinds of surveys possible, Rhoades developed a technique using an approximately 4-foot-long and 6-inch-wide hand-held electromagnetic device which can measure salinity from above ground.

The device, called the EM 38, imposes a primary electromagnetic field on the soil. An electrical flow is produced within the soil in proportion to the soil salinity which then generates its own secondary electromagnetic field which emanates above the soil surface. The EM 38 reads the latter and consequently the amount of salt in the soil.

Rhoades has perfected the use of the EM 38 to the point where two readings are taken, one with the device held perpendicular to the soil surface and one with it held parallel to the surface. The electrical fields come out at the magnetic poles. A programmable pocket-size calculator is used to solve an equation which gives the degree of salinity by intervals within the soil profile.

Like the salinity probe, the EM 38 is commercially available. It measures salinity on a large scale and is good for surveying the salinity conditions of large areas. In a wheat or alfalfa field where the land surface is smooth, the EM 38 works as well as a probe. But in an

At the U.S. Salinity Lab at Riverside, Calif., James Rhoades, USDA Agricultural Research Service soil scientist, developed the electromagnetic salinity probe, left, which measures soil salinity at 6-inch increments down to 4 feet. Rhoades also developed the EM 38, right, which can measure soil salinity from above ground.

Photos by June Davidek, public affairs specialist, SCS, Davis, Calif.

irrigated field with furrows and slightly raised seedbeds, a probe works better.

"The main advantages of the EM 38," said Rhoades, "are that it can be used without making holes in the ground, which disturbs the soil and prevents testing of precisely the same location more than once, and it makes it possible to survey large fields quickly."

Currently, Rhoades is working on another electromagnetic salinity monitoring device which promises to be very useful in irrigation scheduling. The device would be lowered into a permanent plastic access pipe in the soil, and by measuring the electrical conductivity of the soil, it would give the level of soil salinity and the osmotic potential of the soil water. Use of the device would make it possible to schedule irrigations before conditions became too saline and to monitor salinity over a long period of time.

Rhoades said that his device could also be used with a neutron probe which measures how much water is in the soil. From the readings obtained with the neutron probe, scientists estimate how many days it will be until the farmer needs to irrigate. "On saline soils," Rhoades said, "farmers need to know not just how much water is in the soil but how much of that water plants can readily use." By changing the calibration for the neutron probe, he said it would be possible to use the same plastic access tube for the neutron probe and the electromagnetic salinity probe.

Rhoades said that soil salinity hampers agriculture in many parts of the world besides the western United States, including the Middle East, Australia, and South Africa. The electronic salinity probe, the EM 38, and the long-term monitoring device that he is currently developing should prove to be valuable tools here and around the world in controlling soil salinity, conserving water, and protecting productivity.

Nancy M. Garlitz,
associate editor, *Soil and Water Conservation News*, SCS, Washington, D.C.

Reusing Saline Irrigation Waste Water

The U.S. Department of Agriculture's Agricultural Research Service (ARS), through the U.S. Salinity Lab at Riverside, Calif., is conducting three field experiments to evaluate the use of brackish water for irrigation. The source of the saline water is the drainage water from irrigation projects.

"In these experiments we are looking for ways to use the drainage water to produce acceptable yields and protect the soil for future use," said ARS Soil Scientist James Rhoades. Rhoades supervises the experiments which, he says, if successful, may help farmers conserve water and give them flexibility in choosing crops and cropping schedules. Other Federal, State, and local agencies are helping fund the efforts.

One of the experiments is in California's Imperial Valley where a drainage system carries irrigation waste water from 500,000 acres of cropland to the Salton Sea. The Salton Sea is an inland lake that is below sea level and contains water more saline than ocean water. About 1½ million acre feet of drainage water goes into the Salton Sea every year.

An Imperial Valley farmer has permitted 40 acres of his cropland to be used for the experiment which was begun in January 1982. Two cropping patterns are being tested at the site. One is a successive crop rotation of wheat, sugar beets, and melons. In this rotation, Colorado River water of 900 parts per million (ppm) of dissolved salts is being used in the preplant and early irrigations of wheat and sugar beets and for all irrigations of melons. The rest of the irrigations are made with drainage water of 3,000 ppm of dissolved salts.

The other cropping pattern is a block rotation of cotton (a salt-tolerant crop) for several years followed by wheat (a crop of intermediate tolerance) and then by alfalfa (a more sensitive crop) for several years. Drainage water is being used for all or part of the cotton irrigations, but beginning with the wheat, only Colorado River water will be used.

"Wheat should withstand the initial salinity in the soil caused by irrigating the cotton with the brackish water and yield well when irrigated with Colorado River water," said Rhoades. "Enough salt should leach out of the upper soil profile during irrigations with Colorado River water for the alfalfa crop to be grown without loss of yield."

The USDA Agricultural Research Service, in cooperation with other agencies, is conducting several field experiments to evaluate the use of brackish water for irrigation. The experiments are aimed at avoiding crop failure from too much salt in the soil as on this cotton field in California's Imperial Valley and at the same time, conserving water and protecting its quality.

Photo by Tim McCabe, visual information specialist, Public Information, SCS, Washington, D.C.

To date, one wheat crop and one cotton crop have been harvested. The highest yields for these salt-tolerant crops, according to Rhoades, were obtained in both cases with the treatments which received the greatest amount of drainage water substituted for Colorado River water.

Another experiment is being conducted in the San Joaquin Valley near Lost Hills. "The San Joaquin Valley has 5 million acres of irrigated land with no drainage system," said Rhoades. "The water table has been rising with time and now is shallow enough in some places in the valley that the ground water is moving upward making the surface soil more salty. Unless some method is developed to lower the water table, the salt problem will continue to spread—ultimately taking much of the land out of production. Recycling will reduce the value of drainage water that must be carried away, or else collected in evaporation ponds." Onfarm drainage systems are also necessary to keep salt levels low in the plant root zone if the land is to remain productive.

The San Joaquin experiment has been underway for 5 years. It involves 60 plots to which California aqueduct water of 300 ppm of dissolved salts is carried by buried pipe to provide the fresh water for irrigation. The saline water of 6,000 ppm is pumped from a well extending a short distance below the shallow water table. This water also contains 6 ppm of boron, a specifically toxic element. The effects of boron on crop yields are being studied at the lab in Riverside.

"At the plots near Lost Hills a 10-foot-high pipe has valves that enable us to mix and blend the two kinds of water and send out either fresh aqueduct water, saline well water, or a mixture of the two," said Rhoades. "We have been growing cotton here for 4 years in succession using the aqueduct water at germination and then changing over to the saline water when the plants are more salt tolerant."

Wheat is now being grown with aqueduct water to leach out the salts. Following the wheat will be sugar beets and then cotton. "When completed," said Rhoades, "this experiment should provide data to evaluate the long-term effects of our strategy.

"This is a severe test since very saline ground water has been beneath the test area at a depth between 0.4 and 0.9 meter for the last 3 years. This has made it impossible for leaching to take place and is causing the soil salinity to increase to unusually high levels.

"In spite of these problems, 1982 cotton lint yields were good," said Rhoades. "Yields were 2.8 bales per acre on cotton irrigated with aqueduct water only and 2.3 bales per acre on cotton irrigated with drainage water after seedling establishment."

Gylan Dickey, formerly Soil Conservation Service water management engineer in Davis, Calif., and now SCS irrigation engineer at the Midwest National Technical Center in Lincoln, Nebr., said that one solution to the problem in the San Joaquin Valley would be to build evaporation ponds to dispose of the saline drainage water that is no longer suitable for reuse. Dickey said that the ponds are expensive to install and can take as much as 25 percent of a farmer's land out of production. But in parts of the valley, he said, building them is the only alternative farmers have to taking all of their land out of crop production.

Work has begun on a third experiment, said Rhoades, to simulate the field conditions of the two previous experiments. This is the first step in developing a computer model to predict the chemistry of the soil water within the root zone over time for a variety of cropping situations and water quality combinations.

Rhoades stresses that the long-term effects of substituting drainage water for river water in irrigating certain crops at certain periods during the irrigation season and in specific rotations have not yet been fully evaluated. He does say that this strategy has the potential to "conserve water by reducing the amount of water diverted for irrigation, sustain crop production, and reduce the salt loading of rivers by irrigation return flow."

Nancy M. Garlitz,
associate editor, *Soil and Water Conservation News*, SCS, Washington, D.C.

USDA Agricultural Research Service Agronomist Lee Francois at the U.S. Salinity Lab at Riverside, Calif., examines leaf burn on a tomato plant—part of an experiment testing the effects of boron on crop yields. Boron is a specifically toxic element sometimes contained in saline irrigation water.

Photo by June Davidek, public affairs specialist, SCS, Davis, Calif.

News Briefs

Farm Bureau Launches Conservation Tillage Action Plan

The hard economic times and USDA's Payment-In-Kind (PIK) program make 1983 a good year to promote conservation tillage.

That was the message to State Farm Bureau members at this year's meeting of the American Farm Bureau Federation (AFBF). The PIK program and other acreage limitation programs have idled 82 million acres of cropland in the Nation and made it possible for farmers to do the construction work needed for terraces and other practices that will support conservation tillage on these lands.

AFBF leaders encourage the spread of conservation tillage nationwide because, they say, it is the "most economical way to reduce costs, maintain or increase yields on the whole, and save soil." They want to see a conservation tillage equipment rental program in every county which has more than 5,000 acres of row crops and small grain.

Jim Porterfield, assistant director of AFBF's Natural & Environmental Resources Division in Chicago, says this is important because "there is no substitute for hands-on experience. In the counties that have leased conservation tillage equipment for years, such as Wabash County, Ind., and Livingston County, Ill., you can see a pattern—300 acres planted with conservation tillage the first year, 600 acres the second year, 3,000 acres the third year, 6,000 acres the fourth year, and so on. It snowballs."

Porterfield says, "This happened in the Midwest. For example, more than half of Indiana's, Illinois', and Iowa's conservation districts had a conservation tillage equipment rental program last year. Many districts in Iowa have increased from one to two pieces of equipment leased for such programs. But not enough other States have picked up on it yet."

In a pamphlet distributed to every State's Farm Bureau, AFBF suggests working with county extension agents and Soil Conservation Service district conservationists to develop self-guided automobile tours of roadside no-till plots, with maps and information published in the local newspapers.

The Farm Bureau also suggests signs identifying the plots, publicity for successful conservation tillage farmers, contests, and speakers at county Farm Bureau annual meetings. To promote an exchange of ideas among conservation tillage farmers, the Farm Bureau suggests sponsoring fishing trips or picnics.

This past spring, the Maine Farm Bureau, with AFBF's help, filmed conservation tillage demonstrations in Franklin and Waldo Counties. The 12-minute videotape, titled "Conservation Tillage Grows in Maine," will be shown at county Farm Bureau and conservation district meetings, and may be shown on television.

Donald L. Comis,
assistant editor, *Soil and Water Conservation News*, SCS, Washington, D.C.

Tillage Demonstration Encourages Comparison

This past May, the Franklin County Soil and Water Conservation District (SWCD) sponsored a conservation tillage demonstration day at the L. Herbert York farm in Farmington, Maine.

York welcomed a crowd of more than 50 farmers, along with many farm equipment company representatives, local dealers, and Federal and State government officials. York, a past president and director of the Franklin County Farm Bureau, as well as former chairman of the Franklin County SWCD, is now president of the Maine Association of Conservation Districts and a local district supervisor.

The group sat on bales of hay in York's tool shed, sheltered from a rainstorm, as they watched a slide program and listened to speakers. York described his farm and his interest in conservation tillage. There were speeches by representatives of the USDA agencies that helped the conservation district with the demonstrations—the Soil Conservation Service, the Agricultural Stabilization and Conservation Service, and the Extension Service.

The rain stopped after the speeches and slide shows, just in time for the tour of nearby test plots.

A 12.5-acre test area by a major highway had been chosen for the demonstration. York had divided the area into eight plots, five for corn and three for triticale, buckwheat, and clover.

Two of the corn plots were to be planted no-till, with and without residue from the previous corn crop. Two of the plots were for corn planted after different forms of minimum tillage, and the fifth corn plot was to be conventionally planted.

At each plot, equipment industry representatives discussed their equipment. At the two minimum tillage plots and the conventionally tilled plot, the industry people began tilling the plots during the discussions. Then the farmers moved on to watch three types of no-till sod seeders plant the triticale, buckwheat, and clover. None of the corn was planted that day because of the wet soil, so York did the planting himself the next day, after the land had dried a bit.

All the corn plots are equal in size, were planted with the same type of grain corn, and all will receive the same application of fertilizer and pesticides. All will be harvested the same way. The only difference is the level of tillage. Records on seed, planting dates, and soil moisture will be kept and the harvest will be carefully measured.

Many farmers took time to look over the equipment, talk to the dealers, and drive extra equipment in a part of the field near the test plots.

But York says the "primary thrust of the demonstration is to explain the concept of conservation tillage rather than sell equipment." It also allows farmers to "watch the crops for the whole growing season."

York says conservation tillage is "the

coming thing. It will spread as soon as farmers get used to this different, relatively new concept, and understand the different problems and situations it brings. They may not jump up and pay $50,000 for new equipment; but when they are ready to swap their plows, they may buy minimum tillage equipment. That's what I did 8 to 10 years ago," York says. "But conservation tillage is only one tool and can't replace all the other good conservation measures."

York says even those who were not at the demonstration can see the plots as they drive by and read signs identifying each plot. Already, the SCS field office in Farmington has noticed an increase in the number of inquiries about renting conservation tillage equipment.

Paul Hersey,
district conservationist, SCS, Farmington, Maine

No-Till Sod Seeding Grows in Maine

Introducing and demonstrating no-till on hayland and pastureland in Maine, a group of 24 Waldo County dairy farmers are participating in a special no-till sod seeding project.

Dairy farmer Walt Whitcomb helped start the no-till demonstration project. Whitcomb is chairman of the Farm Bureau's State Environmental Awareness Committee in Maine and a Waldo County Soil and Water Conservation District (SWCD) supervisor. Last year, he and C. Ronald Price, the chairman of the Waldo County SWCD and an active Farm Bureau member, demonstrated no-till alfalfa seeding on 12 acres. A dealer provided the sod seeder free for the demonstrations.

This year the conservation district arranged to rent the sod seeder for $6 an acre to any farmer who wants to try it, as the second step in a planned expansion of the project. Most of the farmers are eligible for 75 percent cost sharing, from an Agricultural Conservation Program pot of $30,000.

Whitcomb planted 5 acres of no-till alfalfa for his second year in the project. As part of his regular operation, he also planted 65 acres of no-till corn and 9 acres of minimum till oats. Although he began no-till sod seeding 4 years ago, his experience growing corn, oats, and rye with conservation tillage goes back more than 8 years.

Whitcomb says the abnormally wet spring this year gave no-till farmers nothing but advantages over other farmers. The muddy fields stopped all farmers from planting until the end of May or the first part of June. But when the ground was dry enough for them to plant, no-till farmers were able to plant immediately, while other farmers still had groundwork to do.

The wet spring was followed by a hot, dry period which brought out more advantages of no-till. The moisture trapped by the undisturbed sod and crop residue turned out to be a blessing. Whitcomb says his fields would have been powder dry if it weren't for no-till.

The demonstrations are renewing interest in no-till sod seeders and caused one farmer to uncover an unused one in his barn. He offered to lend it to other farmers when he heard that the sod seeder the district arranged for was overscheduled. Whitcomb says several farmers are discussing the possibility of buying their own no-till seeders rather than waiting for their turn with the rented machine. "There has been a great deal more discussion of conservation tillage as a result of this project."

The pasture no-till seeder is the first machine readily available for rent in Waldo County and is a type originally used in Texas. No-till sod seeders came to Maine several years ago, but there were so many failures initially that they had not caught on.

The Waldo County SWCD supervisors tried to anticipate everything that might go wrong and gathered the latest information on such things as how to use lime and fertilizer properly, when to plant, and how to spray herbicides. This spring, of 40 fields scheduled to be planted, only 15 were, mainly because most of the other fields needed at least another year to reach the required fertility and pH levels for alfalfa.

The results so far are good. Of the fields planted this spring, all had good seed germination except for one. Soil Conservation Service personnel are looking at the plots regularly, to spot problems early and try to find out what is going wrong if there is a problem. Vaughn Holyoke, an extension crop specialist for the Maine Cooperative Extension Service at the University of Maine at Orono, is reviewing the data collected by SCS.

Farmers will visit some of the no-till plots this fall as part of the conservation district's annual conservation tour.

Tour participants and anyone else driving by those roadside plots, identified by signs, will see that no-till works. Whitcomb says the sight of successful crops, along with the availability of no-till equipment, should "eliminate the excuses we farmers have for not trying something new."

Tom Smith,
district conservationist, SCS, Belfast, Maine

Conservation Tillage Is HOT in Mississippi

The Farm Bureau's 1983 national conservation tillage action plan inspired Mississippi officials to begin the most unified erosion control campaign the State has ever had. The goal of the campaign is to cut the State's soil loss in half during the next 5 years.

Every major agency in Mississippi is involved. Known as Operation HOT, for "Hold Our Topsoil," the effort this year centers around two demonstration farms in Hinds County. These model farms will host a statewide field day this fall.

On one farm, Robert Mashburn built terraces and laid underground drainage pipes on about 20 acres of a 38-acre field. Then he planted soybeans with three levels of tillage—no-till, minimum tillage, and conventional. Mashburn left

part of the field unplanted so he could build terraces and lay pipes in front of an audience on the HOT field day.

Mashburn is president of the Hinds County Farm Bureau, president of the Mississippi Soybean Association, and a Hinds County Soil and Water Conservation District (SWCD) commissioner.

Mashburn's neighbor, Sam Owens, recently bought an 80-acre tract of severely eroded soybean land and is converting 60 acres of it to grass for the HOT demonstration. He will also build a small stockwater pond. On the field day he will add a 3-acre pond and plant various trees, shrubs, and forbs for wildlife and beautification.

Local dealers donated most of the equipment and materials being used for the demonstrations and will display more equipment at the field day. The Soil Conservation Service, through the Hinds County SWCD, is providing technical assistance to the farmers.

The details of the HOT campaign were announced at a press conference on Mashburn's farm, followed by a brief tour of the two farms. In the weeks after the press conference, four local television stations have described HOT on their prime-time evening news shows, at least once.

Mississippi State Agriculture Commissioner Jim Buck Ross says he's planning to "blanket the State with education material on the subject." As one example, every conservation district and SCS office in Mississippi is giving away HOT bumper stickers. A fact sheet, brochure, and slide program have also been distributed. Radio and TV programs have been broadcast and news and feature stories have been written about the HOT campaign.

The HOT campaign is a response to Mississippi's severe topsoil losses, which have increased over the past 10 years due to the plowing of a million acres of sloping pasture land to plant soybeans.

Jack H. Winstead,
area conservationist, SCS, Jackson, Miss.

1983 Is a Good Year for Conservation Tillage in Iowa

This spring, the Iowa Farm Bureau called a statewide meeting of its county committees to promote conservation on land set aside for USDA's Payment-In-Kind (PIK) program.

This is just one of many ways Iowa farmers are putting into action the type of ideas the American Farm Bureau Federation (AFBF) is promoting in its "Conservation Tillage Action Plan '83."

For example, the Iowa Farm Bureau hosted a meeting with the Iowa Association of District Commissioners, the Soil Conservation Service, and the Iowa Department of Soil Conservation to find ways to spread conservation tillage. They decided that "untillage" committees were one answer. The Jones County Soil Conservation District (SCD) coined the word "untillage" in 1980 when they established a multi-agency committee to promote conservation tillage.

This spring, at least two local soil conservation districts, the Osceola County SCD and the Grundy County SCD, adopted the idea of untillage pledges, with farmers signing pledges to become eligible for prizes. They set up displays, with Iowa Farm Bureau conservation tillage pledge cards and bumper stickers, at grain elevators and farm supply stores.

Farmers in Buena Vista County and Pottawattamie County formed conservation tillage clubs this year, and farmers in several counties came together to form a ridge tillage club for northwest Iowa.

The Wayne County SCD has begun self-guided automobile tours of no-till farms, with "Look, no-till" signs identifying well-managed fields. The two "o's" in "look" are drawn as human eyes. These signs, designed originally by the Guthrie County SCD, are being used by counties throughout Iowa. The West Pottawattamie County SCD had 15 of these signs made by a local Future Farmers of America chapter, with the percent of residue written on the sign.

The West Pottawattamie County SCD's no-till club became active this year and has gotten together for no-till tours, a pig roast, and a banquet. Soil conservation district commissioners began a strictly no-till yield contest to run simultaneously with the State's conservation tillage contest.

In addition to forming a conservation tillage club, the East Pottawattamie County SCD has begun a number of other promotions this year. They arranged a no-till planter rental program with a local dealer, and they are having no-till contests that measure net returns as well as yields. They are also taking farmers on tours of no-till farms.

Both Pottawattamie County conservation districts will participate in conservation tillage panel discussions with farmers this winter. SCS, working through local soil conservation districts, and the Iowa State University Cooperative Extension Service are planning the workshops for nine counties.

The Clarke County SCD has arranged for the rental of a second no-till planter this spring and scheduled its first conservation tillage field day this summer. They have had a no-till drill for 2 years and have lent it to neighboring counties. Farmers have used the drill to plant cover crops on some PIK acres and have planted more no-till soybeans with a drill this year than last year. The Warren County SCD has added a no-till drill to their existing equipment rental program this year and the Decatur County SCD is looking for funds to buy a no-till drill.

The Clarke County SCD and the Decatur County SCD organized a field day to demonstrate no-till drills and planters.

These types of activities are part of the reason more Iowa farmers are interested in conservation tillage this year than last. But the PIK program has reduced the State's total conservation tillage acreage by reducing the amount of available cropland.

Of course, PIK has also freed land for the installation of terraces and other permanent practices at the same time Iowa has provided more funds for such practices. On the recommendation of

Iowa's Governor Terry Branstad, the Iowa Legislature increased this year's cost-sharing budget from $5.4 to $8.5 million and set up a revolving fund for interest-free loans.

This spring has been a very good season for conservation in Iowa.

Donald L. Comis,
assistant editor, *Soil and Water Conservation News*, SCS, Washington, D.C.

SCS Participates in International Symposium on Salinity Control

At the International Symposium on State-of-the-Art Control of Salinity held in July at Salt Lake City, Utah, about 20 Soil Conservation Service specialists shared their expertise in salinity control and learned about techniques being used by other agencies in the United States and around the world.

"Controlling salinity protects water quality and long-term soil productivity," said George Stem, national salinity control planning coordinator for SCS in Washington, D.C. Stem chaired a session at the symposium on agricultural salinity control programs.

SCS Assistant State Conservationist Harold Brown presented a paper on the salinity control programs in the Uinta Basin, Utah, and Earl Hess, SCS water management engineer in Colorado, talked about efforts in the Grand Valley, Colo. SCS Water Resources Specialist John Hedlund of the West National Technical Center discussed the U.S. Department of Agriculture's cooperative effort to control salinity in the Colorado River Basin.

Salinity control involves many disciplines such as hydrology, hydraulics, engineering, plant sciences, biology, soil sciences, and public policy. The symposium provided the opportunity for researchers, managers, designers, and users from around the world to exchange information on their work. The following countries were represented: Australia, Canada, Israel, Italy, and the West Bank of Jordan.

SCS National Drainage Engineer Walter Ochs, who also attended the symposium, said, "We are always looking for ways to move the salt down below the root zone using as little water as possible. At the symposium we learned about new irrigation and drainage techniques being tested and applied by other agencies in the United States and other countries. One of these techniques is to allow salts to accumulate temporarily between crop rows to save irrigation water."

The symposium was sponsored by the U.S. Bureau of Reclamation, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the Office of Water Research and Technology, the Colorado River Basin Salinity Control Forum, and the U.S. Department of Agriculture. The cosponsors were the American Society of Civil Engineers and the American Geophysical Union.

Nancy M. Garlitz,
associate editor, *Soil and Water Conservation News*, SCS, Washington, D.C.

USDA Proposes a Rule to Implement the Farmland Protection Policy Act

A proposed Federal rule draws upon the Land Evaluation and Site Assessment (LESA) technique for the criteria to evaluate effects of all Federal programs on the conversion of farmland to other uses. (For an explanation of LESA, see the March 1983 issue of *Soil and Water Conservation News.)*

The rule would require the Soil Conservation Service to compute a land evaluation score for all farmland in every county where federally assisted development is anticipated. It would also encourage every State and local government to designate farmland of statewide or local importance, with the concurrence of SCS State conservationists, if they want it given consideration for protection in the evaluation. The Federal agencies involved in proposed developments on prime or unique farmlands or farmlands of statewide or local importance would have to compute the site assessment score for sites under consideration.

The rule, published in the Federal Register on July 12, 1983, describes how the Farmland Protection Policy Act provisions of the Agriculture and Food Act of 1981 will be implemented.

Since the Secretary of Agriculture has delegated to SCS major responsibilities for farmland protection under the Act, the rule describes the types of technical assistance SCS would provide. SCS personnel would serve as general advisors regarding the Act and take the initiative to be sure Federal, State, and local agencies understand it.

SCS would also, upon request, help States, local governments, and private, nonprofit organizations protect farmland from unnecessary conversion to nonagricultural uses. As part of this aid, SCS would give soil maps and other soil and water resource information to these agencies and help them to develop and use a LESA system.

The proposed rule neither applies to nor regulates independent actions of private individuals, organizations, or State or local governments. It does, however, apply to a wide range of Federal agency decisions on applications by landowners and others for Federal assistance for farmland conversion.

Public comments on the rule were accepted by the U.S. Department of Agriculture until September 12. The final rule will be published after the comments have been considered and the proposal has been reviewed.

Donald L. Comis,
assistant editor, *Soil and Water Conservation News*, SCS, Washington, D.C.

Third Annual World Food Day Observance Set

Countries worldwide have organized a variety of activities to mark the third annual World Food Day on October 16, 1983.

Established by the Food and Agriculture Organization of the United Nations, World Food Day is a vehicle to raise public consciousness of food and development issues and to confront the challenge of world hunger, malnutrition, and poverty.

In many developing countries, soil degradation is accelerating through soil erosion, drought, salinity, and waterlogging. Some countries have unfavorable soil and climatic conditions that restrict them in meeting present food requirements, much less food needs for future generations.

To help foster good stewardship of soil and related resources, scientists and technicians with USDA's Soil Conservation Service share their knowledge and expertise with many foreign countries.

Financed by the Agency for International Development, the United Nations, World Bank, and host countries, some 150 SCS specialists each year help resolve soil and water resource management problems in more than 40 countries. Also, some 200 visitors from 30 countries come to the United States each year to work with SCS specialists.

Much of the world's population increase over the next century will take place in the developing third world countries where food shortages are most acute. A large part of the food required by this additional population will have to be produced by increasing the productivity of existing cultivated land. Agricultural research and technical assistance provided by SCS's Soil Management Support Services (SMSS) staff will help increase food production while conserving resources. In its next 5-year program the SMSS staff will devote more attention to reducing soil erosion, conserving natural resources, and providing technical assistance to a host of developing countries. The SMSS staff plans to conduct eight agrotechnology training courses involving more than 400 persons from nearly 25 countries by the end of 1983.

A sharing of international agricultural technology today is essential to help meet the food requirements of future populations.

Ted Kupelian,
writer-editor, Public Information,
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USDA Agencies Streamline Reporting System

On October 1, 1983, USDA's Soil Conservation Service and Agricultural Stabilization and Conservation Service (ASCS) joined forces to eliminate paperwork and attack the most urgent resource problems in the Nation.

On that day the agencies began a joint national reporting system to collect data on the land treatment practices ASCS provides cost sharing for and land treatment practices SCS provides technical assistance for. They will collect data not only on the amount of practices installed for erosion reduction but also on the amount of water saved and effects on water quality. In the past, they had measured the amount of practices applied but had not sufficiently measured the effects these practices had on the Nation's resources.

The National Conservation Program (NCP), presented to the U.S. Congress last December as required by the Soil and Water Resources Conservation Act (RCA) of 1977, caused the agencies to look for a better way to measure the effects. The NCP also encouraged the agencies to work together to concentrate their resources on the worst problems first.

The agencies saw the Conservation Reporting and Evaluation System (CRES) as a way to merge their reporting requirements. CRES, a joint SCS-ASCS conservation practices data collection, storage, retrieval, and evaluation system, was developed for the SCS Conservation Technical Assistance (CTA) evaluation in fiscal year 1983.

In the spirit of Reform '88, a bipartisan effort to streamline the Federal government, ASCS dropped its long-used form for reporting Agricultural Conservation Program (ACP) cost-shared practices. SCS expects to save even more time and money by requiring land treatment reports on the CRES form from only 335 counties, instead of the more than 3,000 counties in the Nation.

USDA's Statistical Reporting Service helped select the counties for a random sampling that is about 95 percent statistically reliable at the national level, according to SCS Operations Management Division Director J. Mack Presley.

SCS has created a separate reporting system for land treatment at the State level, with several options SCS State offices can choose from or combine to design a system that meets their needs. But that information, while accessible on a USDA computer system, will no longer be sent to SCS National Headquarters. Only the sample counties submit land treatment reports.

The computer system has been modified to provide immediate summaries of SCS State office reports as often as needed. CRES data are also immediately available on the system. Previously these State office progress reports were available after 6 months or more, usually too late for program managers to use them.

A major side effect of CRES has been to prod SCS to more rapidly improve its technology not only for estimating erosion but also for measuring the effects of conservation practices on soil productivity and water conservation.

SCS is planning to further streamline its national progress reporting system for fiscal year 1985.

Donald L. Comis,
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Coon Valley Days

This bird's-eye view of part of the Coon Creek watershed shows a floodwater retarding dam, managed woodlands, and stripcropped fields. These conservation practices, designed to reduce soil erosion, have been in place on these farms for 50 years.

The people of the Coon Valley, Wis., area celebrated the 50th anniversary of the Soil Conservation Service's first erosion control demonstration project on August 13 and 14. Donald Fencl chaired the organizing group. On July 19, 1953, local people held a 20th year celebration. That the farmers are proud of their soil conservation measures is the best testimonial to the enduring value of the work accomplished in the thirties.

On October 10, 1933, Hugh H. Bennett selected Coon Creek as the first project designed to demonstrate the values of comprehensive farm planning for soil conservation. As Bennett made plans to spend the $5 million allotted for the work, he decided to establish a number of watershed based projects near the erosion control research stations. Under this arrangement the superintendent of the station could supervise the project while continuing to guide the research. Also, results of the research could be tested on nearby farms. Logically, Raymond H. Davis, superintendent of the Upper Mississippi Valley Erosion Experiment Station at La Crosse, Wis., would head a project in the Driftless area.

Other factors recommended the Coon Creek area as a suitable trial. It was representative of a larger area which could benefit from the demonstration and experimentation. Some of the farmers were already stripcropping to reduce erosion. Diversified farming, including dairy and beef cattle, corn, small grains, hay, and pasture, boded well for the adoption of stripcropping.

Initiatives by Davis, farmers, officials at the University of Wisconsin, and others account for Coon Creek's selection. Davis began discussions in September with Noble Clark, Aldo Leopold, and others at the university. On October 3, Davis, Clark, and possibly Leopold met with Bennett in Washington and reached an agreement.

As Davis began contacting farmers and holding meetings, he was gratified and encouraged by the response. He wrote to Bennett, "I was surprised at the way farmers grasped the importance of such a program. They all realize the necessity of something being done. . . ." SCS signed cooperative agreements with 418 of the 800 farmers in the 90,000-acre project area. The farmers, Civilian Conservation Corps enrollees, and other emergency employment workers stabilized streambanks, crushed limestone, controlled gullies, fenced woodland from grazing, built terraces and waterways, and planted trees and wildlife feeding areas. But it was stripcropping under longer crop rotations that came to dominate the landscape.

The Coon Creek Project was a success; indeed the demonstration concept worked. During the forties, fifties, sixties, and into the seventies, farmers in surrounding valleys began stripcropping. Due to studies of the thirties and recent appraisals, it is possible to determine the effects of soil conservation measures in the area. In a 1982 U.S. Geological Survey Professional Paper, Stanley W. Trimble (University of California at Los Angeles) and Steven W. Lund (U.S. Army Corps of Engineers) found that Coon Valley's current erosion rate was less than one-fourth that of 1934.

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